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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte NIRANJAN DAMERA-VENKATA

Appeal 2009-013880
Application 10/698,899
Technology Center 2600

Before ROBERT E. NAPPI, KRISTEN L. DROESCH and
JASON V. MORGAN, *Administrative Patent Judges*.

DROESCH, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant seeks review under 35 U.S.C. § 134(a) of a final rejection of claims 1-38, all of the claims pending in the Application. We have jurisdiction under 35 U.S.C. § 6(b). We REVERSE.

BACKGROUND

Appellant's disclosed invention relates to methods of embedding information in an image, and extracting information embedded in an image. Spec. 1; Abs.

Claims 1 and 12 are illustrative and are reproduced below (disputed limitations in *italics*):

1. A method of processing a contone image, the method comprising:

determining a bi-level bitmap of bits from a graylevel value, wherein each of the bits has a respective one of either a first value or a second value;

partitioning the contone image into an array of contone image blocks;

generating a sequence of graphical code word symbols encoding information; and

producing blocks of an output halftone image from ones of the contone image blocks and ones of the graphical code word symbols in accordance with the values of respective ones of the bits of the bi-level bitmap, wherein ones of the output halftone image blocks associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived from respective ones of the graphical code word symbols.

12. A method of extracting information embedded in a halftone image, the method comprising:

accessing a bi-level bit map;

partitioning the halftone image into a plurality of image blocks;
using the bitmap to select at least some of the blocks;
identifying a code word sequence in the selected blocks;
and
extracting the information from the code word sequence.

Rejections

Claims 1-11 and 21-28 stand rejected under 35 U.S.C. § 112, 1st paragraph as failing to comply with the written description requirement.

Claims 1-11 and 18, 28 and 38 stand rejected under 35 U.S.C. § 112, 2nd paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-7, 10, 11 and 29-34 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Curry (5,710,636), Tai (7,218,420) and Wang (5,337,361) (“Wang ’361”).

Claims 8 and 9 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Curry, Tai, Wang ’361 and Lapstun (6,512,596).

Claims 12-20 and 35-38 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Wang (6,252,971) (“Wang ’971”), Curry and Wang ’361.

ISSUES

1. Did the Examiner err in finding that the limitation “wherein ones of the output halftone image blocks associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived from respective ones of the graphical code word symbols,” recited in independent claims 1 and 21 fails to comply with the written description requirement of section 112, 1st paragraph?

2. Did the Examiner err in finding that the limitation “wherein the determining comprises producing the bitmap by halftoning a contone patch of the graylevel value,” recited in dependent claim 3, fails to comply with the written description requirement of section 112, 1st paragraph?
3. Did the Examiner err in determining that the limitations “the bits having the first value are derived from respective ones of the contone image blocks,” and “the bits having the second value are derived from the respective ones of the graphical code word symbols,” recited in claim 1 render claims 1-11 indefinite under section 112, 2nd paragraph?
4. Did the Examiner err in determining that the limitation “using the set of probability parameters to select a likely sequence of graphical code word symbols,” recited in dependent claims 18, 28 and 38 render the claims indefinite under section 112, 2nd paragraph?
5. Did the Examiner err in determining that the combination of Curry Tai and Wang ’361 teaches or suggests “producing blocks of an output halftone image from ones of the contone image blocks and ones of the graphical code word symbols in accordance with the values of respective ones of the bits of the bi-level bitmap, wherein ones of the output halftone image blocks associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived from respective ones of the graphical code word symbols,” as recited in claim 1, and similarly recited in independent claim 29?
6. Did the Examiner err in determining that the combination of Wang ’971, Curry and Wang ’361 teach or suggest “[a] method of extracting

information embedded in a halftone image . . . comprising . . . partitioning the halftone image into a plurality of image blocks,” as recited in independent claim 12, and similarly recited in independent claim 35?

ANALYSIS

We have reviewed the Examiner’s rejection in light of Appellant’s arguments in the Appeal Brief presented in response to the Final Office Action and the Reply Brief presented in response to the Examiner’s Answer. We agree with Appellant’s conclusions. We highlight and address specific findings and arguments for emphasis as follows.

Rejection of claims 1-11 and 21-28 under § 112, 1st paragraph

The Examiner finds that the limitation “wherein ones of the output halftone image blocks associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived from respective ones of the graphical code word symbols,” recited in independent claims 1 and 21 is not disclosed in Appellant’s Specification as originally filed. Ans. 3-4, 24-25. The Examiner directs attention to Appellant’s Specification paragraphs 31, 33, 42, 43 and Figures 2A, 3, and 4 and asserts:

There is no functional structure elements, steps, or processes supporting the features of “respective ones of the bits having the first value **are derived** from respective ones of the contone image blocks” and “and ones of the bits having the second value **are derived** from respective ones of the graphical code word symbols” (emphasis are added by the examiner) as claimed in the invention of claims 1 and 21 in the original disclosure.

Ans. 3-5, 25-27.

We agree with Appellant's arguments that the subject matter of claim 1 is described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor had possession of the claimed invention at the time the application was filed. App. Br. 8; Reply Br. 6. More specifically, we agree with Appellant's argument that one skilled in the art at the time the application was filed would have understood from the explicit teachings of the Specification that blocks of the output halftone image 390 are produced from ones of the contone image blocks $x(m)$ and ones of the graphical code word symbols 360 in accordance with the values of respective ones of the bits of the bi-level bitmap 310, wherein ones of the output halftone image blocks associated with respective ones of the bits 310 having a value 0 are derived from respective ones of the contone image blocks, and ones of the output halftone image blocks associated with respective ones of the bits 310 having a value of 1 are derived from respective ones of the graphical code word symbols 360. App. Br. 7-8; Reply Br. 4-6 (citing Appellant's Specification ¶¶ 30, 31, 33, 42; Fig. 3). Although the Specification does not provide *in haec verba* support for the claimed subject matter, the disclosure reasonably conveys to one with ordinary skill in the art at the time of the application that the inventors had possession of the claimed subject matter. *See Purdue Pharma L.P. v. Faulding, Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000); *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

The Examiner also finds that the recitation of dependent claim 3 "wherein the determining comprises producing the bitmap by halftoning a contone patch of the graylevel value," is not disclosed in Appellant's original Specification. Ans. 6, 27-29. The Examiner finds that paragraph 13

of Appellant's Specification "merely [re]cites 'The bitmap may be produced by halftoning the constant patch of the graylevel' without functional structure elements, steps or processes disclosed [] to support the feature of "wherein the determining comprises producing the bitmap by halftoning a contone patch of the graylevel value." Ans. 6, 27-29.

We agree with Appellant that the subject matter of claim 3 is described in the Specification in such a way as to reasonably convey to one skilled in the art that the inventor had possession of the claimed invention. App. Br. 9; Reply Br. 8. In particular, we agree with Appellant's assertions that: (1) a "contone patch" is disclosed in paragraph 13 of the Specification and in each of claims 2, 22, and 30, as originally filed; and (2) paragraph 13 of the Specification also discloses that the bit map is produced by halftoning a constant patch of a graylevel. App. Br. 9; Reply Br. 7.

For these reasons, we cannot sustain the Examiner's rejection of claims 1-11 and 21-28 under 35 U.S.C. § 112, 1st paragraph for failure to comply with the written description requirement.

Rejection of claims 1-11 and 18, 28 and 38 under § 112, 2nd paragraph

The Examiner finds that the same limitation of independent claim 1 renders the claims indefinite because Appellant "failed to particularly point out how and in what extent the derivation of values from 'contone image block' and 'graphical code word' discussed in the claim rejection under 35 U.S.C. 112, first paragraph." Ans. 7. The Examiner further explains that without the written description support in the disclosure, one ordinary skill in the art does not know how and to what extent that the features of "respective ones of the bits having the first value **are derived** from respective ones of the contone image blocks" and "and ones of the bits

having the second value **are derived** from respective ones of the graphical code word symbols” are carried out. Ans. 33-34 (emphasis in original).

We agree with Appellant’s arguments that the Examiner has not sufficiently explained why one of ordinary skill in the art, when reading the claims in light of the Specification and prior art, would not have been able to ascertain with a reasonable degree of precision and particularity the particular area set out and circumscribed by claims 1-11. App. Br. 12; Reply Br. 10.

The Examiner also determines that claims 18, 28 and 38, which recite “using the set of probability parameters to select a likely sequence of graphical code word symbols,” are rendered indefinite “because the word ‘likely’ used in the claim language is an uncertain word.” Ans. 8. The Examiner further explains that using words like “likely” in a claim is considered indefinite. Ans. 34.

We agree with Appellant’s argument that one of ordinary skill in the art, when reading claims 18, 28 and 38 in light of the Specification, would have been able to ascertain with a reasonable degree of precision and particularity the particular areas set out and circumscribed by claim 3. App. Br. 13; Reply Br. 11. In particular, we agree that one with ordinary skill in the art when reading claims 18, 28 and 38 in light of the Specification would have been able to ascertain that a likely sequence of graphical code word symbols is a graphical code word sequence that has a high probability of being the actual code word sequence that was encoded into the halftone image based on the ordinary meaning of the term “likely”. *Id.*

For all these reasons, we cannot sustain the Examiner’s rejection of claims 1-11, 18, 28 and 38 under section 112, 2nd paragraph as indefinite.

Obviousness rejections of claims 1-11 and 29-34

Appellant disputes whether Curry teaches or suggests “producing blocks of an output halftone image from ones of the contone image blocks and ones of the graphical code word symbols in accordance with the values of respective ones of the bits of the bi-level bitmap, wherein ones of the output halftone image blocks associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived from respective ones of the graphical code word symbols,” as recited in claim 1.

The Examiner finds that Curry teaches:

producing blocks of an output halftone image (e.g. halftone cells 20, 22 & 24 of Fig. 3) from ones of the contone image blocks (e.g. blocks or cells or sample values of grayscale input images discussed above) and ones of the graphical code word symbols (e.g. the letter “R” of Fig. 3) in accordance with the values of respective ones of the bits of the bi-level bitmap (e.g. the “1”s and “0”s of bitmap codes discussed above, col 1, lines 46-50 and col 4, lines 57-63), wherein ones of the output halftone image blocks (e.g. halftone cells 20, 22 & 24 of Fig. 3) associated with respective ones of the bits having the first value are derived from respective ones of the contone image blocks (e.g. the bit values, “1”s and “0”s are derived based on the presence or absence of marks of the contone image blocks, or cells, or sample values discussed above, col 1, lines 46-50) and ones of the output halftone image blocks associated with respective ones of the bits having the second value are derived (e.g. generated) from respective ones of the graphical code word symbols (e.g. bitmap codes are generated based on a desired pattern or “the graphical code word symbols” to be embedded within the halftone image, and the desired pattern is input into bitmap generator 10 of Fig. 1, col 3, lines 36-45, and to encode the data either by the presence or “1”, or absence or

“0” of marks at a sequence of spatial locations, col 1, lines 46-50 discussed above). Ans. 9-10, 37-38 (emphasis omitted).

We agree with Appellant’s argument that instead of teaching the disputed limitations of claim 1, the cited portions of Curry teach that the output halftone image is formed from output halftone cells that encode information in their respective orientations. App. Br. 18; Reply Br. 13. Appellant directs attention to Curry’s Figure 3 as depicting regions of the output halftone image that contain the human-readable pattern and regions of the output halftone image that do not contain the human-readable pattern are formed by halftone cells encoded with both ones and zeros. *Id.* We also agree that Curry describes background art in which a pattern encodes data with the presence or absence of marks (citing Curry col. 1, ll. 46-50), but that this disclosure does not even remotely suggest that Curry’s system operates by placing halftone cells in some areas of the output halftone image and not others. We further agree that the 1’s and 0’s shown in Curry’s Figure 3 do not indicate the presence or absence of marks and instead represent a data value that may be encoded in each of the halftone cells and which encode information in their respective rotational orientations. Reply Br. 14 (citing Curry col. 4, ll. 59-62); *see also* Curry col. 2, ll. 51-53; col. 3, ll. 2-5, 47-58; col. 4, ll. 15-18; 27-32; 41-44; 62-65; Figs. 2A-2C.

For these reasons, we cannot sustain the Examiner’s rejection of claims 1-7, 10, 11 and 29-34 as obvious over Curry, Tai and Wang ’361. As applied by the Examiner addressing the limitations of dependent claims 8 and 9, Lapstun does not remedy the deficiencies of Curry. Therefore, for the same reasons as claim 1, we cannot sustain the Examiner’s rejection of claims 8 and 9 as obvious over Curry, Tai, Wang ’361 and Lapstun.

Obviousness rejection of claims 12-20 and 35-38

The Examiner finds that Wang '971 teaches a method of extracting information embedded in a halftone image including partitioning the halftone image into a plurality of image blocks. Ans. 17-18. In support of the findings, the Examiner directs attention to Figure 6 of Wang '971 and asserts that the halftone image is partitioned into a series of tiles, or blocks, and directs attention to column 4, lines 1-28 which discloses “these tiles establish the basic building blocks from which zero phase-shifted clustered halftones can be converted to TT phase-shifted cluster halftones” as indicating that halftone image is partitioned into tiles or blocks. Ans. 18, 48.

We agree with Appellant’s argument that Wang '971 does not disclose that an input image containing embedded information is partitioned into a plurality of image blocks, but instead teaches detecting and visualizing the embedded information (i.e., watermark) by analyzing the input image to determine the average amplitude and angle of halftone frequency and overlapping the input image with a checkerboard reference pattern that is generated to have the same halftone frequency and size of the input image. App. Br. 26; Reply Br. 22 (citing Wang '971 col. 7, ll. 25-39, 56-65; Figs. 12-13). We further agree with Appellant’s argument that, contrary to the Examiner’s position, column 4, lines 1-28 of Wang '971 instead teaches how a watermark is embedded in an input image, not how information is extracted from an input image. Reply Br. 22

For these reasons, we cannot sustain the Examiner’s rejection of claims 12-20 and 35-38 as obvious over Wang '971, Curry and Wang '361.

DECISION

We REVERSE the rejection of claims 1-11 and 21-28 under 35 U.S.C. § 112, 1st paragraph as failing to comply with the written description requirement.

We REVERSE the rejection of claims 1-11 and 18, 28 and 38 under 35 U.S.C. § 112, 2nd paragraph as indefinite.

We REVERSE the rejection of claims 1-7, 10, 11 and 29-34 under 35 U.S.C. § 103(a) as unpatentable over Curry, Tai and Wang '361.

We REVERSE the rejection of claims 8 and 9 under 35 U.S.C. § 103(a) as unpatentable over Curry, Tai, Wang '361 and Lapstun.

We REVERSE the rejection of claims 12-20 and 35-38 under 35 U.S.C. § 103(a) as unpatentable over Wang '971, Curry and Wang '361.

REVERSED

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